

ABSTRACT

The present invention provides a worked molybdenum-alloy material that can be used at higher temperatures than
5 at least temperatures at which known TZM alloys are used.

A worked molybdenum-alloy material having high strength and high toughness includes at least one of carbide particles, oxide particles, and boride particles and fine nitride particles dispersed by internal nitriding of an
10 untreated worked molybdenum-alloy material in which a nitride-forming-metal element is dissolved to form a solid solution in a molybdenum matrix and at least one of carbide particles, oxide particles, and boride particles is precipitated and dispersed. The worked molybdenum-alloy
15 material is manufactured by subjecting a worked alloy material, which has a matrix composed of molybdenum, in which at least one of carbide particles, oxide particles, and boride particles is precipitated and dispersed and in which at least one of titanium, zirconium, hafnium, vanadium,
20 niobium, and tantalum is dissolved to form a solid solution, to multi-step internal nitriding treatment including a stepwise increase of the treatment temperature.